

**UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION**

NEUROGRAFIX, a California corporation;
NEUROGRAPHY INSTITUTE MEDICAL
ASSOCIATES, INC., a California corporation;
and
IMAGE-BASED SURGICENTER
CORPORATION, a California corporation,

Plaintiffs,

vs.

BRAINLAB, INC., a Delaware corporation;
BRAINLAB AG, a German corporation;
BRAINLAB MEDIZINISCHE
COMPUTERSYSTEME GMBH, a German
corporation,

Defendants.

Civil Action No. 12-cv-6075

Hon. Matthew F. Kennelly, Presiding

Magistrate Judge Jeffrey Cole

**DECLARATION OF MICHAEL HOCH,
M.D., AS TO EXHIBIT T- “FUNCTIONAL
MRI (fMRI) BRAINLAB PROCESSING
GUIDE” TUTORIAL**

I, Michael Hoch, M.D., declare as follows:

1. I am over the age of 18, a resident of Philadelphia, State of Pennsylvania. I am a neuroradiologist, board certified in both in Diagnostic Radiology and Neuroradiology. I attended Medical School at Temple University School of Medicine; my Internship at St. Luke’s Hospital – Bethlehem Campus; my Residency at Temple University Hospital; and Fellowship at NYU Langone Medical Center. I am currently a neuroradiologist and Assistant Professor of Clinical Radiology. practicing at Penn Medicine. as part of Penn Medicine’s Neuroradiology Services Program. I have knowledge and expertise in the areas of diagnostic imaging, diagnostic tests; MRI (Magnetic Resonance Imaging) including advanced MRI techniques such as fMRI (functional Magnetic Resonance Imaging), BOLD fMRI (Blood-oxygen-level-dependent-functional-MRI), and DTI tractography (diffusion tensor imaging), which also includes) and language localization for surgical planning; nuclear imaging, radiofrequency ablation (RFA) and surgical planning, among others.

2. **EXHIBIT T** attached to this declaration is a true and correct copy of my tutorial titled, “Functional MRI (fMRI) BrainLab Processing Guide” uploaded onto YouTube on June 23, 2019 through the username “LearnNeuroradiology” which is *available at*: https://youtu.be/XVK_ZgZ4A4E

3. I declare that I authored the tutorial depicting my performance of the steps for education purposes, and declare that I am the speaker and demonstrator depicted in said tutorial,

performing each of the steps of BrainLab's Functional MRI (fMRI) BOLD Guide, by relying on the BrainLab's Functional MRI (fMRI) BOLD Guide and other BrainLab manuals included for iPlan Cranial software.

4. I declare that the "studies" referenced in the very beginning of the tutorial at timestamp 0:15, that are used by me in the tutorial, consist of fMRI data that I obtained through having the patient perform a task while being imaged, which I performed with the intent to use the fMRI technique to map out certain brain regions or structures which would be activated by having the patient perform those specific tasks.

5. I declare that the following is a true, accurate copy of the "description" section of the YouTube tutorial, that I authored and declare to be accurate, which is located at the bottom of said video, from the date it was uploaded.

"Blood oxygen level dependent functional MRI, or BOLD fMRI, is an advanced MRI technique in which level of oxygen present in an area of the brain is used to map out what parts of the brain are activated in specific tasks. In this method, repeated imaging of the brain can be performed while the patient performs a task, and the level of oxygenation changes, showing which parts of the brain are most activated.

A key application of fMRI is mapping of language areas, or language localization, for surgical planning. The patient will perform more than 1 language task while in the scanner, and the activation data is overlaid on anatomic imaging (like conventional T1 or T1 postcontrast imaging). This is used to determine which side of the brain is language dominant as well as where exactly important language areas, including Broca's and Wernicke's areas, are located. This way they can be avoided in complex surgical procedures. However, sometimes results can be difficult to interpret because of the high number of images and high amounts of noise.

There are a number of processing suites that you can use to process fMRI data, including Brainlab and Dynasuite. The processing can be slightly different depending on which software package you are using, but the general principles are the same. To begin, you take each functional paradigm and overlay it on anatomical imaging, selecting statistical parameters and colormapping as you go.

In this video, Dr. Michael Hoch demonstrates the use of Brainlab to process fMRI data for language processing. He goes through the step-by-step process of generating each set of overlay imaging and how to interpret the results. In the second part of the video, he demonstrates conjunction overlay technique to increase sensitivity for mapping language areas by showing only the areas which have overlapping results on multiple paradigms, increasing reader confidence. The level of this lecture is appropriate for radiology residents, radiology fellows, and trainees in other specialties who have an interest in advanced MRI techniques such as diffusion tensor imaging (DTI) tractography, functional MRI (fMRI), and surgical planning.

Check out this video and additional content on <http://www.learnneuroradiology.com>”

6. Exhibit T accurately explains my performance of the steps taken in the tutorial instructional guide relying on BrainLab’s manual.

I declare under penalty of perjury, under the laws of the United States, that the foregoing is true and was executed on August 21, 2020.

A handwritten signature in black ink, appearing to read "MHoch", is positioned above a horizontal line.

Michael Hoch, M.D.